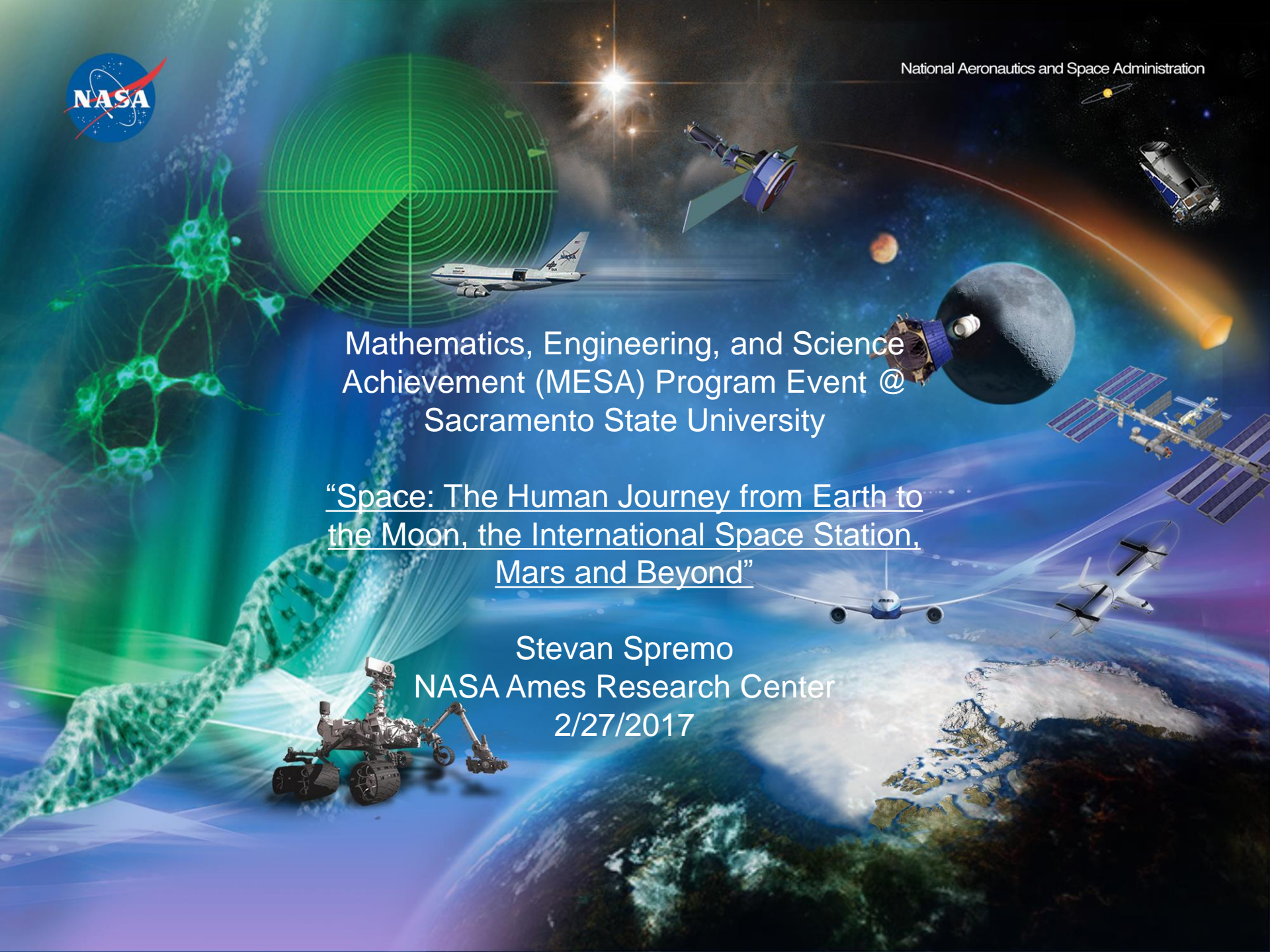


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Mathematics, Engineering, and Science
Achievement (MESA) Program Event @
Sacramento State University

"Space: The Human Journey from Earth to
the Moon, the International Space Station,
Mars and Beyond"

Stevan Spremo
NASA Ames Research Center
2/27/2017

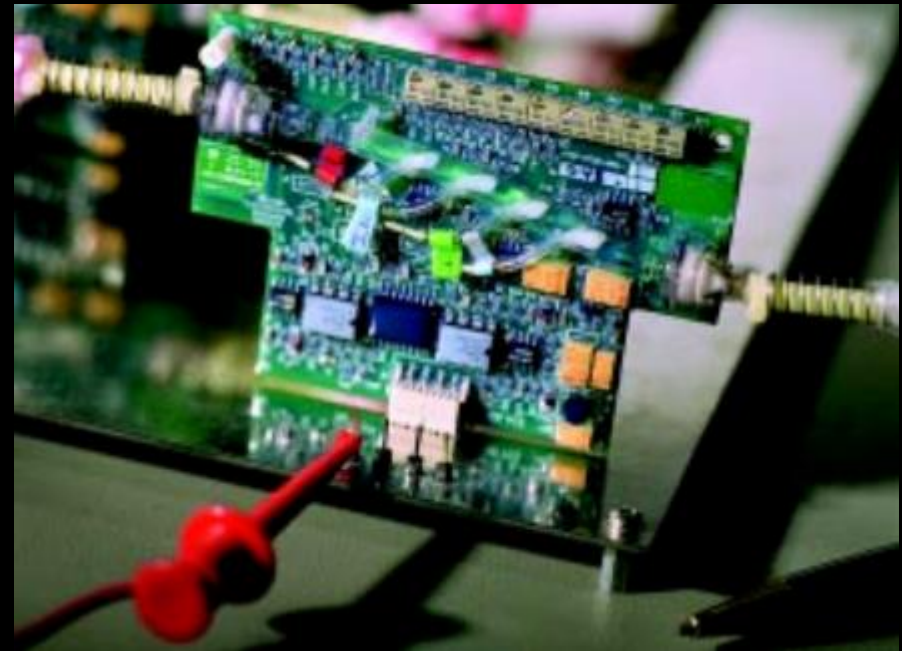
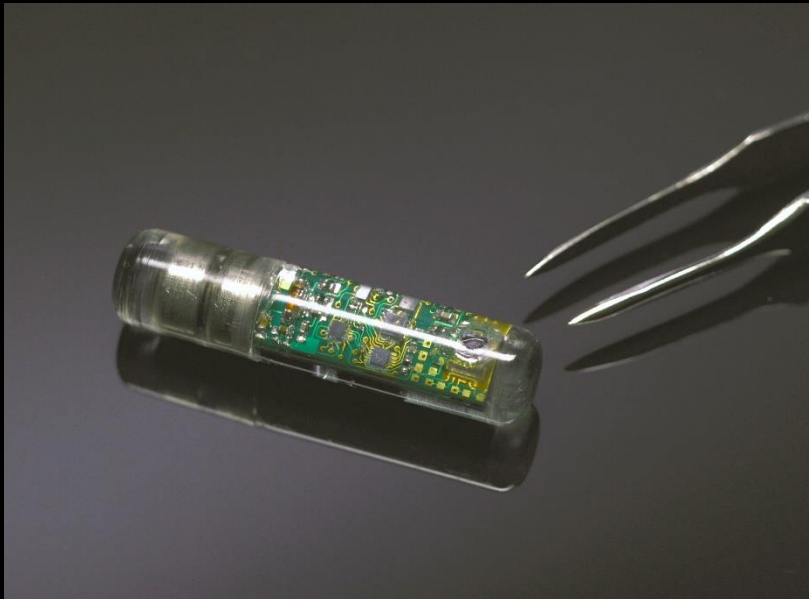




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NASA BIOSENSORS



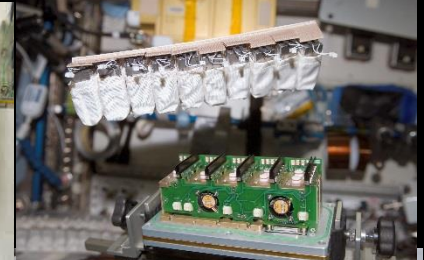
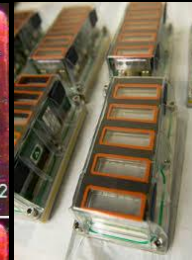
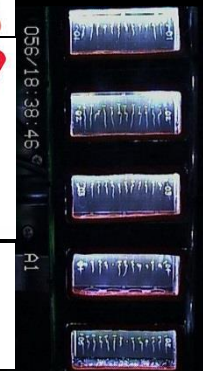
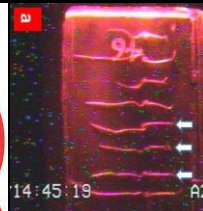
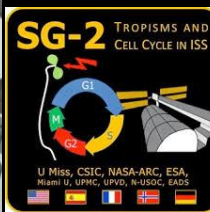
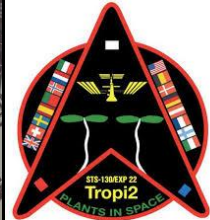
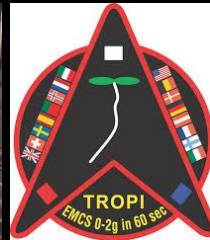
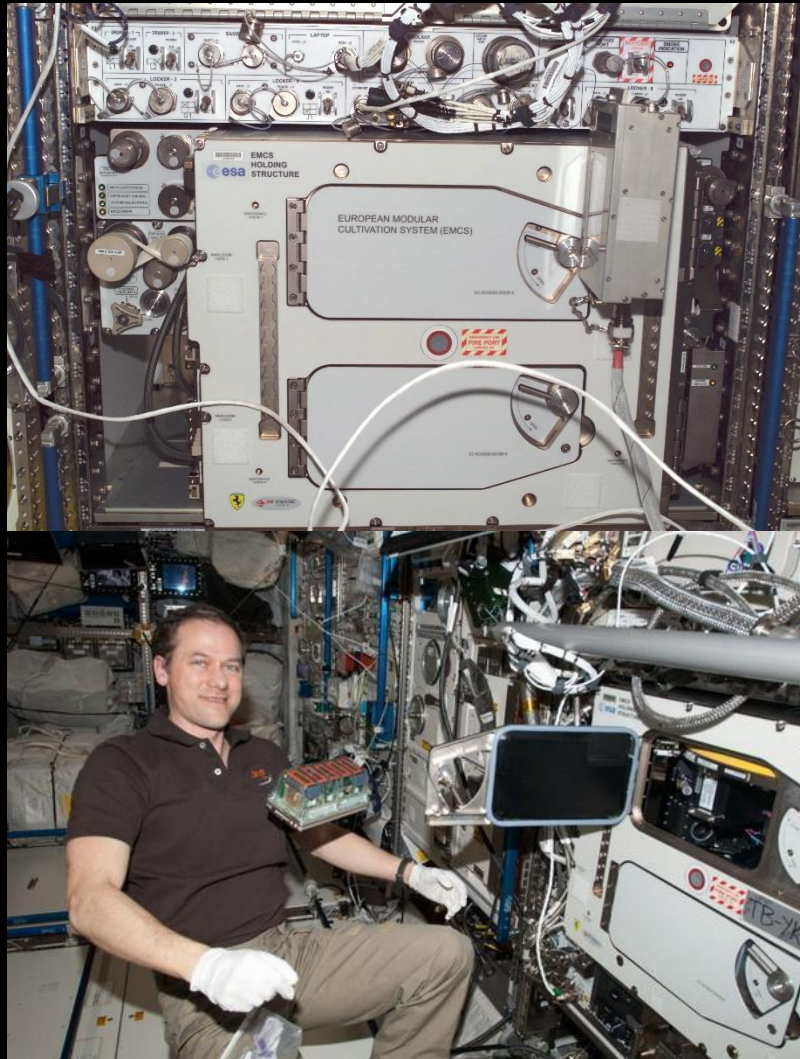


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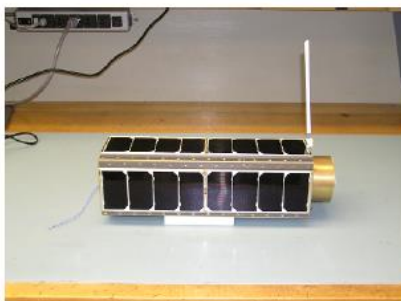
PLANT SEEDLING CENTRIFUGE EXPERIMENTS ON ISS

EMCS-TROPI, Seed Growth, Plant Signaling

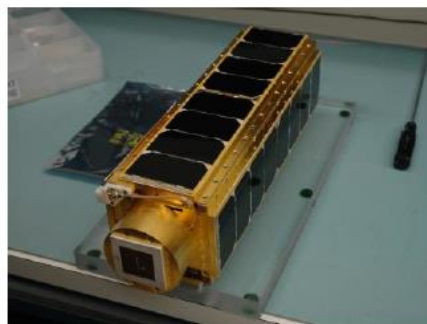




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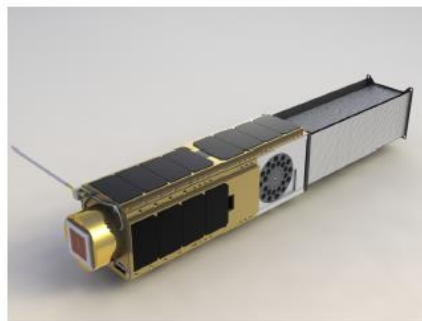
GeneSat-1 - 2006



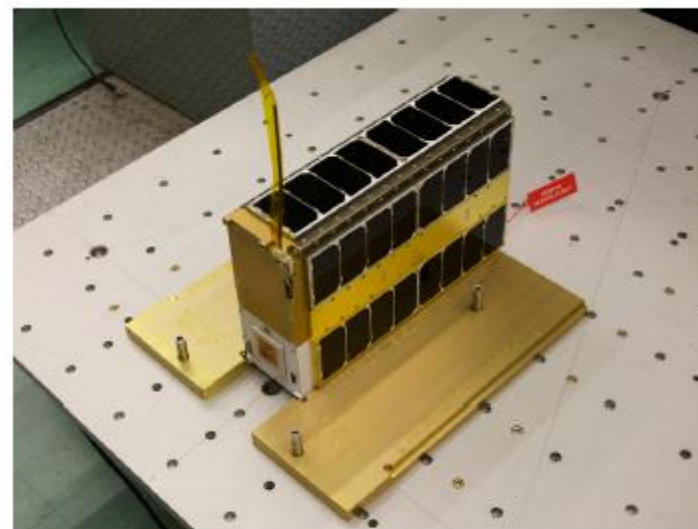
PharmaSat- 2009



NanoSail-D2 - 2010



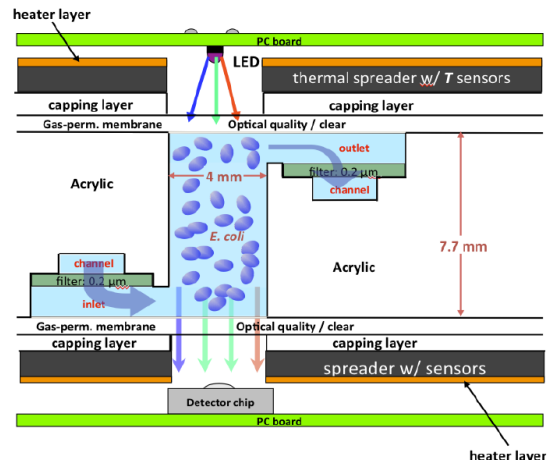
O/OREOS - 2010



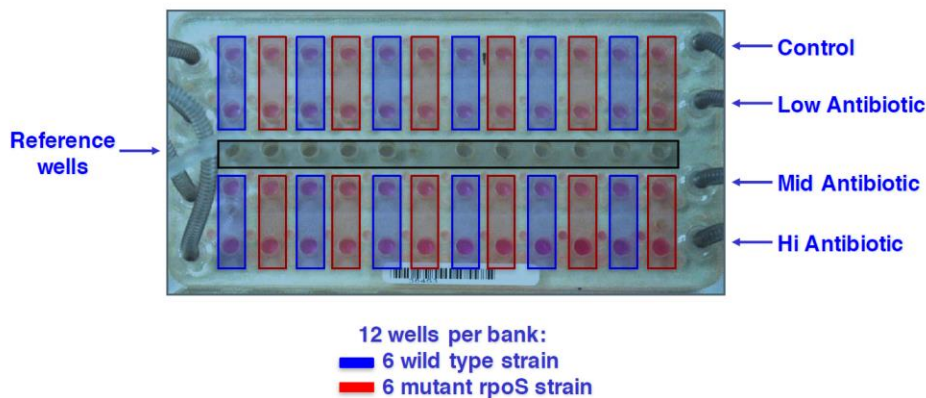
EcAMSat

EcAMSat Payload

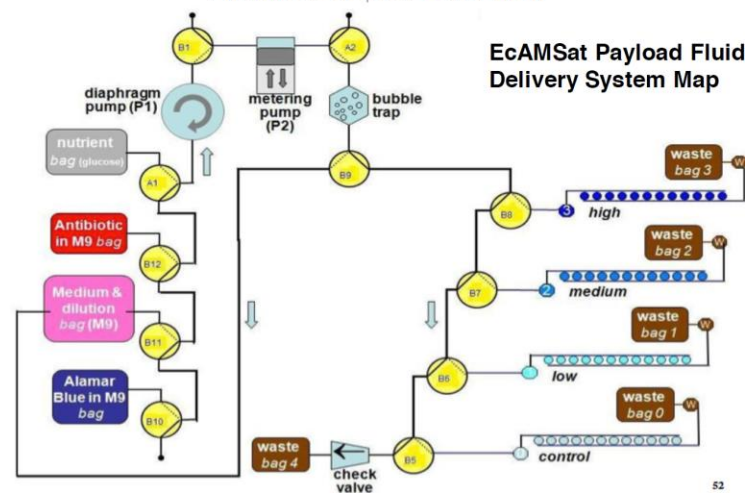
- Determine how microgravity alters the antibiotic resistance of uropathogenic *E. coli* (UPEC) to Gentamycin
- PharmaSat payload, with finer filter size to accommodate change from yeast to *E. coli* ($0.45\ \mu\text{m}$ to $0.2\ \mu\text{m}$)
- *E. coli* population is measured using optical density of well, utilizing Alamar Blue dye.



EcAMSat Fluidic Card



Fluidics System Overview





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EcAMSat 6U Spacecraft

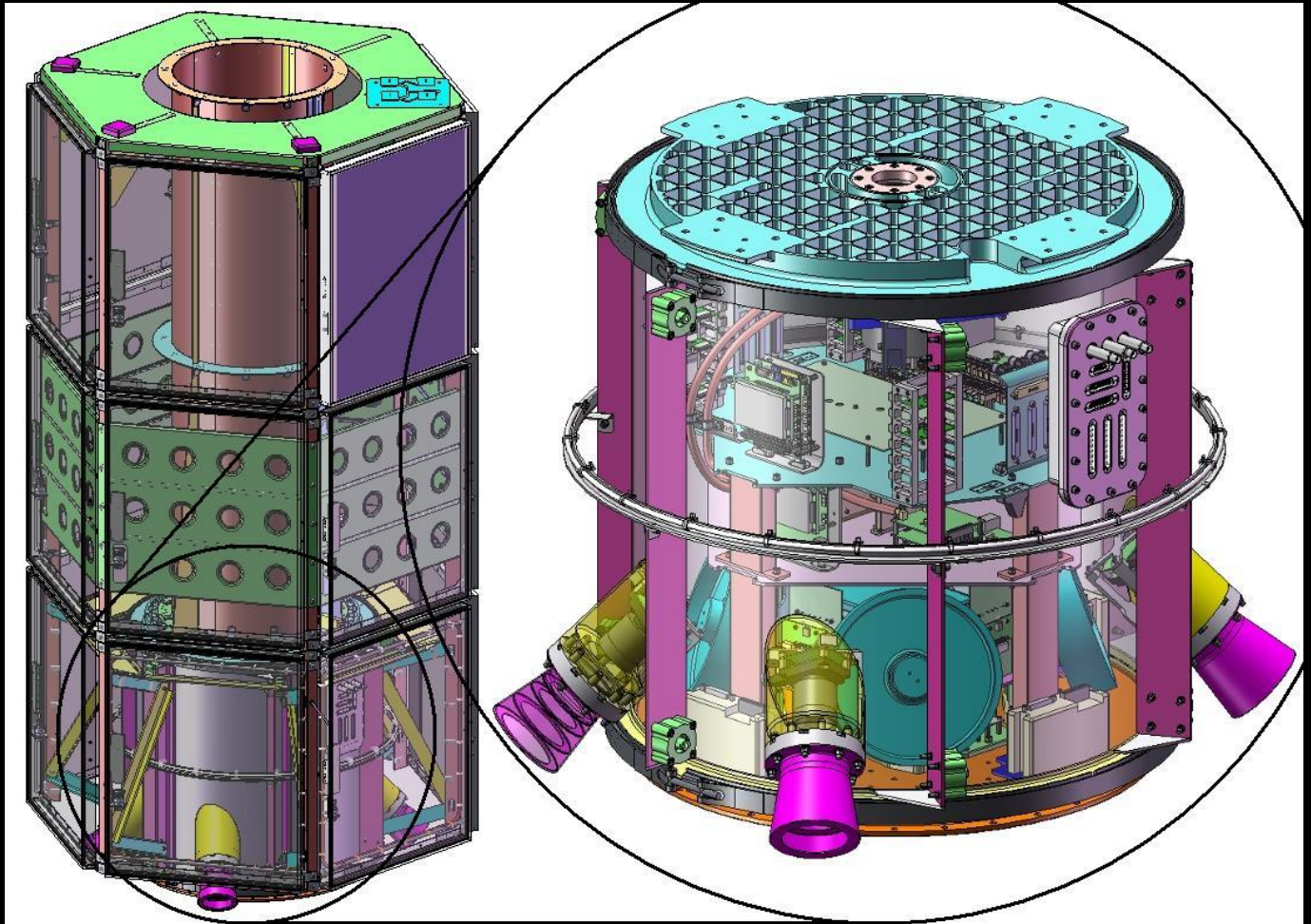




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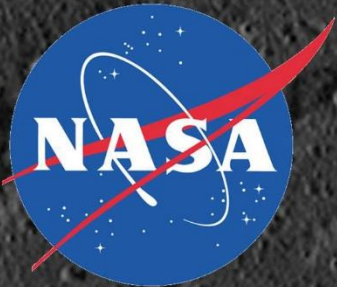
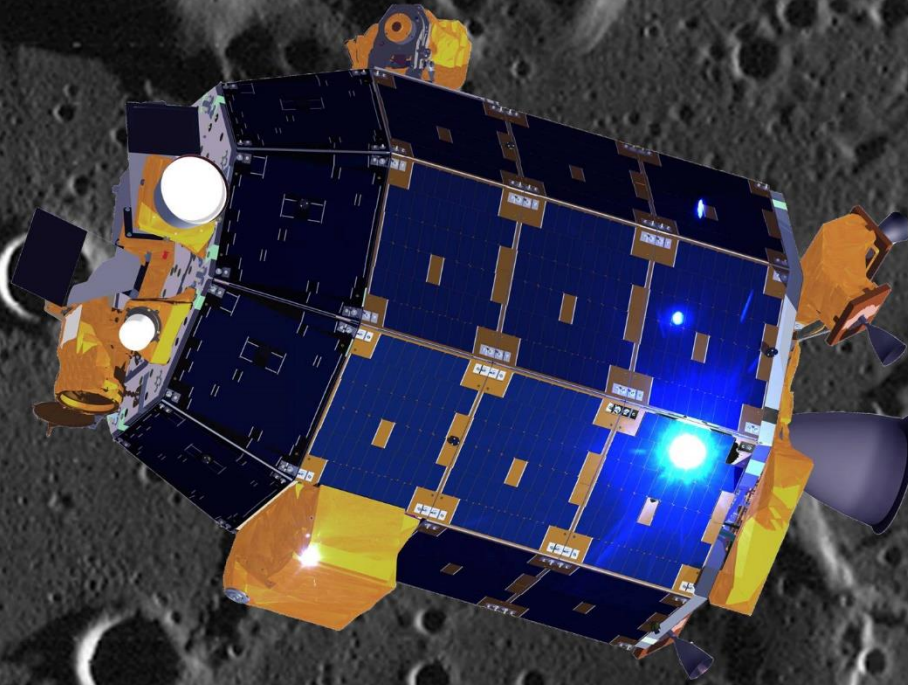


Cost Optimized Test of Spacecraft Avionics and Technologies (COTSAT)



LADEE

Lunar Atmosphere and Dust
Environment Explorer



NASA Ames Research Center NASA
Goddard Space Flight Center



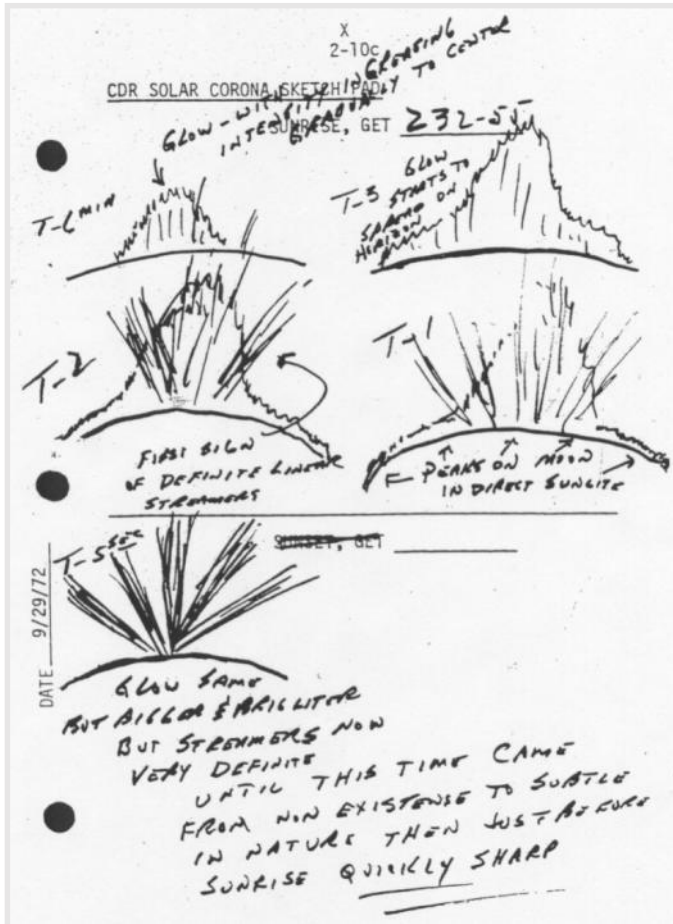
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Evidence of Dynamic Dust

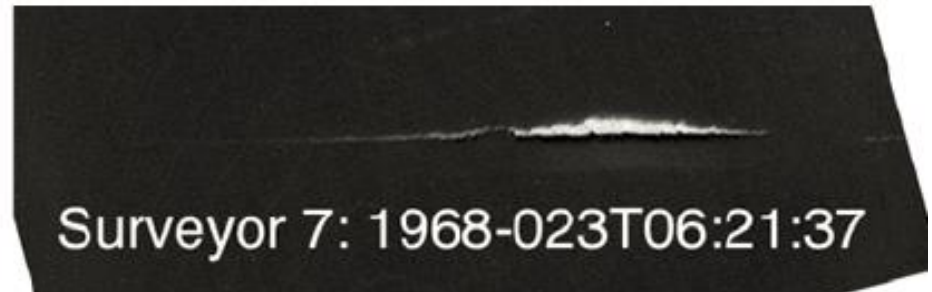
From lunar orbit...

Gene Cernan sketches from Apollo
Command Module

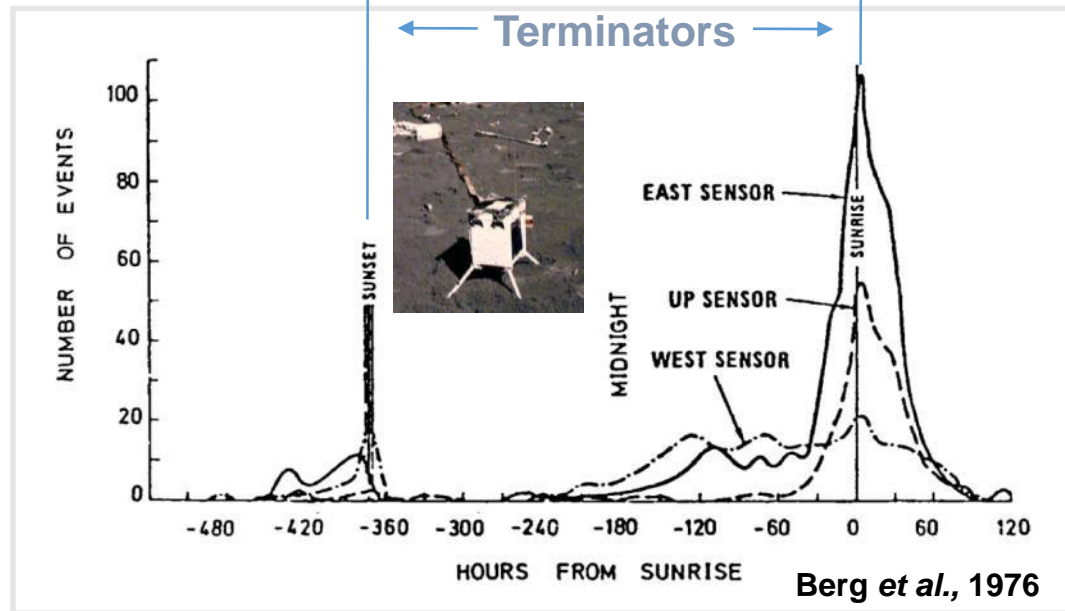


McCoy and Criswell, 1974

...and on the lunar surface



Lunar Ejecta and Meteorites experiment (LEAM)

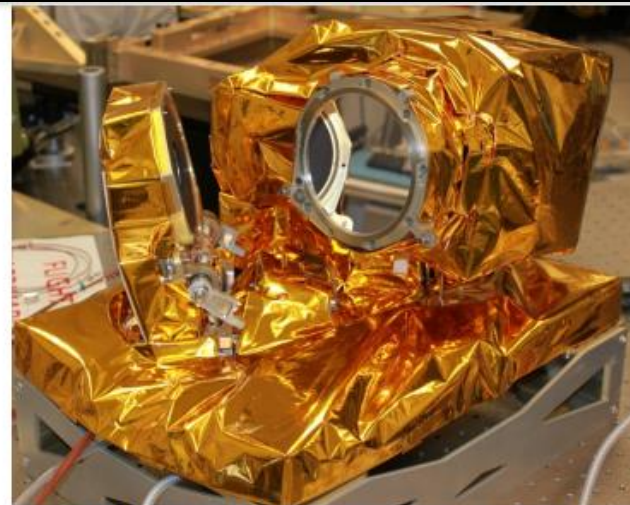




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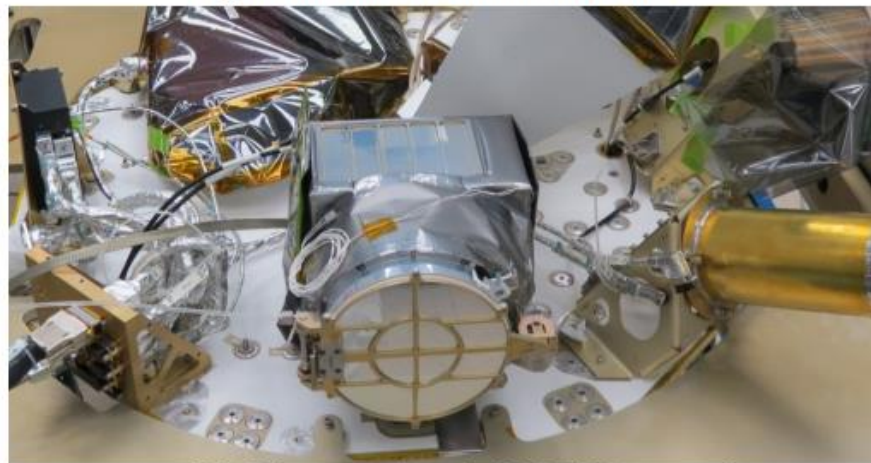
NMS Integrated on the LADEE Spacecraft



Flight LLCD OM in Performance Tests



UVS Integrated on the LADEE Spacecraft



LDEX Integrated on the LADEE Spacecraft



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Minotaur V Launch Vehicle Stacking LADEE Encapsulated in Fairing





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Minotaur V LADEE Launch September 6, 2013





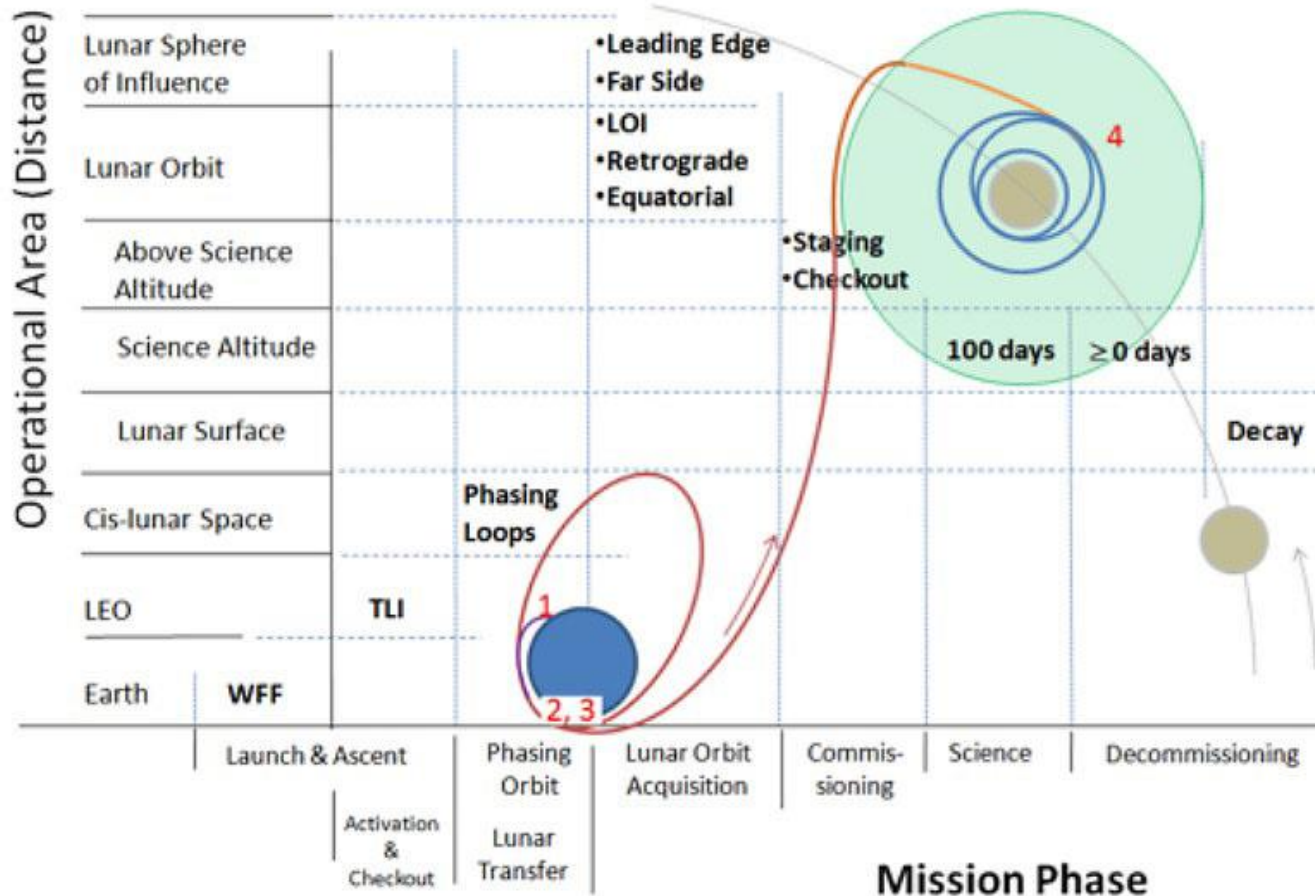
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Photo Credit: Ben Cooper



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1 Launch:
Minotaur V
Launch Vehicle

2 TLI:
STAR 37 FM
Upper Stage

3 TCM(s):
Perigee/Apogee
Bipropellant

4 LOI:
Bipropellant

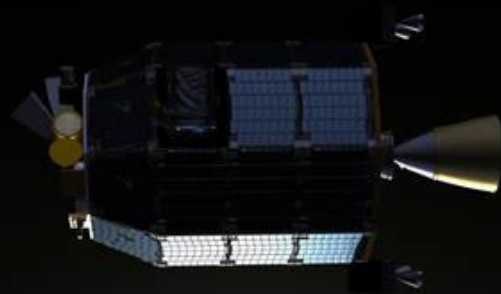


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LADEE Flight Operations

6 September 2013 - 17 April 2014

